SLUG NEWSLETTER

sinclair LOUISVILLE USERS GROUP

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Sinclair Louisville Users Group Newsletter, August 1987

The Sinclair Louisville User Group meeting came to order July 12, 1987 at 2:15 PM. The turnout was good for the yearly election (assignment???) of officers this year. The results are...

President - Jim Pitts takes over for Jim Dodrill....
Secretary - Bob Crecco will do his best on this one....
Librarian - Ed Radtke retains his position....
Treasurer - John Hamilton will give this a try relieving Paul Kinney who served well....
Editor - Shawn Merrick, a recent new member & ADAM user (see editorial for ADAM) will take on this tough one. He needs our input, so let's get those articles & programs out to him.
Public Relations - Ray Manley retains his position as well.

Let's give these new club officers & our club our full support. A special thanks goes out to Jim Dodrill for the fine job of running the newsletter & filling the President's position, all at the same time. I'm sure Jim will lend support to the newsletter & club as he steps down from his positions.

Jim Pitts, our new president, gave us the first lesson of machine code programming. He did not get a chance to copy his handouts, so he used the chalkboard to describe the Z80 computer & number systems including HEX, DECIMAL, & BINARY. For those that attended, copies of the handouts are included in this issue. For those that missed, be there next meeting if you want to know what they mean.

After Jims excellent tutorial, the meeting was adjourned at 4:00 PM with hopes of a better year ahead for Sinclair & ADAM users.

Bob Crecco

*** Editorial ***

All of our readers must be wondering why an ADAM user is the newsletter editor. SLUG has been considering to expand its membership to include ADAM users for a few months. It was ultimately agreed by all that this expansion would be good for both Sinclair & ADAM owners. Both machines are Z80 computers, & each continues to get nationwide support from user groups & third-party developers. I will do my best to put together a newletter for both computers. In the meantime, if you have anything you would like to submit for free use by our newsletter (for either computer), please do. Take care, & thank you for keeping home computers alive!

Shawn Merrick

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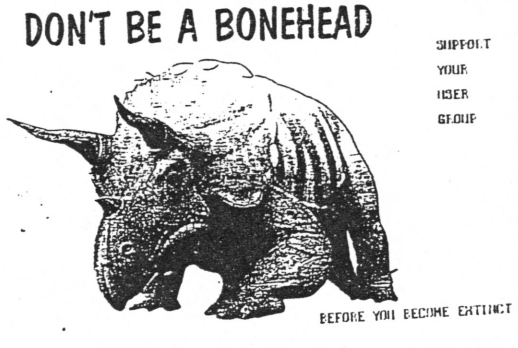
KEY IN THIS SHORT LISTING TO TRACE THE VARIABLES IN YOUR PROGRAM. PLACE IT IN FRONT OF YOUR PROGRAM AND GOTO 5 TO USE IT. YOU WILL GET A LIST OF THE LINES THAT THE VARIABLE YOU ARE LOOKING FOR IS IN

```
   5 INPUT "Variable to ...
v$: LET l=LEN v$
  10 LET p=PEEK 23635+256*PEEK 2
3636
  15 LET v=PEEK 23627+256*PEEK 2
3628
  20 LET n=256*PEEK p+PEEK (p+1)
  25 LET le=PEEK (p+2)+256*PEEK
(p+3)
  30 PRINT n
  35 LET q=0: LET c=1: FOR j=4 T
O le+4
  40 LET p1=PEEK (p+j)
  45 IF p1=34 THEN LET q=NOT q
  50 IF q THEN GO TO 90
  55 IF p1=14 THEN LET j=j+5: GO
 TO 90
  60 IF p1=58 THEN LET c=c+1
  65 IF p1<>CODE v$(1) THEN GO T
O 90
  70 FOR k=1 TO l
  75 LET p1=PEEK (p+j+k-1): IF p
1<>CODE v$(k) THEN GO TO 90
  80 NEXT k: LET k=PEEK (p+j+k-1
): IF k=36 OR (k>47 AND k<58) OR
 (k>64 AND k<90) OR (k>96 AND k<
123) THEN GO TO 90
  85 PRINT FLASH 1; INK 2; PAPER
 7;n;: PRINT INK 9;TAB 5;":";c;T
AB 10;v$
  90 NEXT j
  95 LET p=4+p+le: IF p=v THEN S
TOP
 100 GO TO 20
9998 SAVE "TRACE" LINE 0
```



Machine Language Programming on
the Timex/Sinclair

A BOOK REVIEW

I thought that I had read every good book written about the internal workings of the ZX81 computer. Then came "A Practcal Guide to Machine Language Programming on the Timex/Sinclair 1500 and 1000". The title seems a little long but it is indicitive of the precision and thouroughness that lies within. I picked up the book from a stack resting before the author, David B. Wood at the 1987 Midwest T/S Fest in Indianapolis. I was a bit cocky about paying $12.00 for a book which I was certain was covered in my many volumes at home. I said something dumb like,"I hope I can get something out of this." Well, I received another well deserved lesson in humility. Believe me, this is the best book ever written about this subject.

Begin Wood's book by looking at Chapter 16 and Appendix One. These portions will help you if you need to review the Z80s registers and commands. Then go to the beginning and start digging in. Here is where you will not only begin to understand the Z80 CPU, but will start. to see the brilliant ways it was implemented in this computer. I can't begin to do the book justice in this brief review,but allow me to note some of the highlights:

-Listings for machine code loaders and even a HEX ASSEMBLER.
-Good explanations of memory organization.
-Thourough discussion of basic line organization and associated system variables.
-An understandable explanation of floating point operations with practcal mechanisms for using the calclator stack for passing information between basic and machine code routines.
-Excellent explanations of basic variable structure with routines for dissecting them into usable form.
-routines for shuffling around memory as nonchalantly as the rom does.
-An entire chapter on passing parameters between basic and machine code routines.
-Complete explanation of keyboard inputs and practical routines for cassette I/O.
-helpul appendices.
-Wood's book is saturated with handy M/C routines with every explanation.
-The best listing of ROM routine and how to use them. A signficantfeature is the notation of the contents of the Z80 registers before and after a ROM routine is accessed.

Now I am supposed to mention a few things I didn't like about the book but I can't think of any. I would love to see a bit more on using the printer, and alas no one seems to be willing to publish a really good routine for outputting hi-res pictures to the screen, even though it can be done. These are just personal whims, however.
If you are a machine code fan buy this book! It's worth every penny of the $14.95 regular price. Write to David at Sirusware, 6 Turning Mill Road, Lexington, MA. 02173.

Jim Pitts

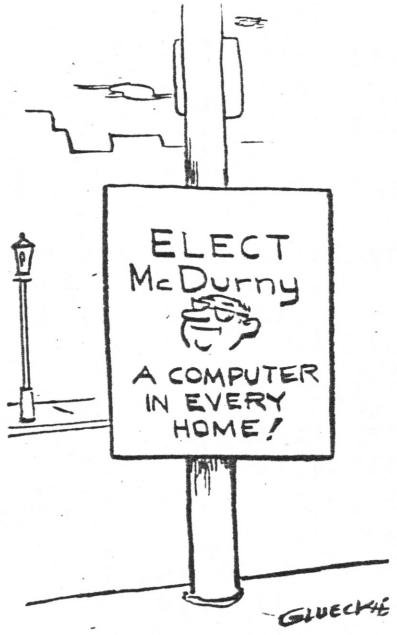
Well it was a hard fought,greuling election, but now that I have acquired the prestigious post of president, I think my first official act should be to initiate a rousing round of applause for ex-prez Jim Dodrill. I think we would all agree that our group would be glitch filled memory if not for Jim's donation of countless hours of service. THANK YOU JIM!!

Let me toss out some thoughts on what I feel the future could hold for us. The inclusion of ADAM computer users into our group is a potential shot in the arm for us. Yes we will experience some dilution of purpose, but we didn't quit when they brought out the 2068 or the QL did we? I believe we will be enriched by new ideas and enthusiasm. Shawn Merrick's bulletin board is an example of what can be gained. We have discussed the idea of submitting newsletter material through the BBS using textfiles in Xmodem format. Finally, a good use for all of those $7.50 modems.

The meetings are going great. The sharing of our understanding in various fields is a real plus. We have slacked off on carrying in our computers. Maybe we should each make a resolution to bring in a machine and some of our favorite software at least every other time. Take a few minutes to jot down what yo would like to discuss before the next meeting. If you are having a particular software or hardware problem, bring it up for discussion.

Let's revitalize the newsletter. How about each of us submitting a profile of our interests, favorite programs, hardware etc.. I would really love to see all of you non-local members do this for us. We'd like to get to know you better. What about all those gizmos you bought at the Indy Timexfest? How about some reviews on your new stuff? Write a program. Show us how you modified an existing one. As Jim D. would say,"Don't be a Bonehead."

Jim P.



CATS
CAPITAL AREA TIMEX/SINCLAIR USERS GROUP
NEWSLETTER

from THE PLOTTER N/L of CLACKMAS COUNTY, OREGON

PATCH FOR *D & *E COMPILATION BUG

TIMEMACHINE Users:

It has come to our attention that there is a small bug in the version of TIMEMACHINE which you have. Most users will not even be aware of this bug because it is rather obscure. You will only encounter this bug when you are compiling very large programs and are forced to use *D & *E to compile the data statements separately. Please follow the instructions below to correct your copy of TIMEMACHINE.

After the program has loaded (while the backup prompt is still on the screen), break into the program by deleting the left quote and entering STOP (SYMBOL SHIFT A).

Add the following lines to Basic:

SPECTRUM VERSION

```
20 FOR i=1 TO 4
21 READ address, n
22 FOR j= 0 TO n-1
23 READ byte: POKE address+j, byte
24 NEXT j
25 NEXT i
100 DATA 23952,4
101 DATA 205,240,133,0
102 DATA 29145,4
103 DATA 205,240,133,0
104 DATA 29906,4
105 DATA 205,247,92,0
106 DATA 34288,12
107 DATA 17,0,0,205,247,92,192,237,
91,241,68,201
```

TS 2068 VERSION

```
Lines 20 to 25 same as Spectrum.
100 DATA 26834,4
101 DATA 205,0,130,0
102 DATA 32070,4
103 DATA 205,0,130,0
104 DATA 32858,4
105 DATA 205,71,104,0
106 DATA 33280,12
107 DATA 17,0,0,205,71,104,192,237,
91,241,68,201
```

Now, type GOTO 8000 and ENTER to make a new backup copy

Book review:
QL Archive-Bluprint
by Ian Murray

Well! This one is different! If you want to find out about ARCHIVE, this is the book to get. Ian Murray has combined a lot of good information with a generous dollop of humor, and come up with a winner.

Like other books of this nature, this handbook makes no assumptions about your familiarity with databases. If you are an advanced user, however, there is plenty of 'meat' to chew into.

The book is accessible in a number of ways. It is framed by an elaborate table of contents at the first, to a complete index at the end. In the body of the text, entries are shown, and discussed, keystroke by keystroke - building from basic concepts to complex manipulations of multiple files. As commands are introduced, the discussion of the command itself is set off in a clearly marked block of text, making later reference easy.

The clairity of the text is helped by the design: First, the size of the book - a full 8 by 10 inches - allows space to easily set off chapter and section headings for easy scanning. Second, the creative and appropriate use of varying type fonts allows a clear seperation of the varying types of information that must be conveyed in a book of this nature.

The actual examples used are centered around keeping track of information needed for a wedding (the story of the preparations for the wedding is fleshed out with cartoons of the participants). The characters create and manipulate files, and you are encouraged to follow along, keystroke by keystroke. Each entry is discussed, in terms of its relevance to the current operation. When a new command is introduced, another block of text allows a clear description of the implications of the command. When a new programming concept is introduced, a box is used to set this discussion off from the 'narrative.' Periodically, there are complete program listings, so that you can verify your work so far, or (as an advanced user) crib subroutines for your own use [who, me ???].

Recommendation? If you want to master Archive, this book can be a real help. It provides the kind of user-friendly access that is so painfully missing from Archive itself.

For the computer neophyte, as well as the experienced, is a glossary of the most commonly used computer "buzz" words and their definitions....

Acoustic coupler — A device that allows a telephone handset to be used for data transmission by transforming digital signals from your computer to modulated sound waves (analog signals) which can travel over regular phone lines. It is a type of modem.

Analog — A type of transmission formed by variable and continuous waveforms representing information. Voice signals transmitted over phone lines are of the "analog" type.

ANSI — American National Standards Institute, which is the main standards development organization in the U.S. supported by trade groups, professional associations, and corporations.

Artificial intelligence — A term generally used when describing the use of a computer to accomplish tasks normally thought of as exclusively human. Natural language interfaces and expert systems are two of the most common applications of artificial intelligence principles.

ASCII — American Standard Code for Information Interchange Developed by ANSI, this standard specifies a seven–bit digital code for each of the ninety–six displayable characters on a micro–keyboard. It also specifies thirty–two control characters, which are usually not displayable on video terminals or printers. ASCII has also been adopted in Europe. Only seven bits (128 possible combinations) are needed to specify a particular character. An eighth bit is sometimes used for parity checking hence ASCII is sometimes referred to as an eight–bit code.

Asynchronous — A type of communication in which the timing and the frequency of the signal being sent is not crucial. In this mode, each transmitted character includes a start and stop bit. Therefore, accurate reception of the data being transmitted does not depend on precision timing between the sending and receiving machines.

Bar codes — Vertical marks or bars on prerecorded tags which can be sensed and read by a machine. The width and combination of vertical lines are used to represent data.

Baud/Baud rate — A measure of the signaling speed for data transmission devices. The baud rate is the number of discrete signal changes per second. Modems are described by the baud rate at which they can transmit data.

Bell 103 — AT&T® specification for a modem providing asynchronous originate/answer transmission at speeds up to 300 bits per second (300 baud).

Bell 201 — AT&T specification for a modem providing synchronous data transmission at 2400 bits per second.

Bell 212 — AT&T specification for a modem providing full–duplex asynchronous data transmission at speeds up to 1200 bits per second on the voice (dial–in) phone line network.

Bisynchronous transmission — An IBM® communications protocol involving the continuous exchange of synchronized signals between two telecommunications devices, still widely employed, though replaced in current IBM data communications products by the bit–oriented synchronous data link control.

Break–Out Boxes — Break–Out Boxes (BOBs) are devices that allow the enabling/disabling, jumpering, crossing over, and busing of interface signals.

Buffering — The process of temporarily storing data to allow transmission devices to accommodate differences in data rates, perform error checking, and retransmit data received in error.

Byte — Generally an 8–bit quantity of information, used mainly in referring to parallel data transfer, semiconductor capacity, and data storage. Also generally referred to in data communications as a character.

Carrier signal — The signal on which information can be impressed for transmission. A carrier signal is modulated and demodulated according to fixed protocols. An example of a carrier signal is the set of tones generated by a modem for transmission on the regular phone lines.

CCITT — International Telegraph and Telephone Consultative Committee.

Centronics — The Centronics® Standard was developed by the Centronics Company, a manufacturer of printers. This standard is for parallel digital communications. The Centronics protocol became a defacto standard as a large number of printers were installed. The Centronics Parallel Interface is a 36–pin, byte interface with eight lines carrying their respective binary bits in parallel.

Character — Standard bit representation of a symbol, letter, number or punctuation mark; generally means the same as byte.

Coaxial cable — A cable composed of an insulated central conducting wire wrapped in another cylindrical conducting wire. The package is usually wrapped in another insulating layer and an outer protective layer.

Connector — A physical interface, such as RJ–11 or EIA RS–232 typically with male and female components.

CPU — Central processing unit. The portion of a computer which directs the sequence of operations and initiates the proper commands to the computer for execution.

Data — Digitally represented information, which includes voice, text, facsimile and video.

Data Communications — The transfer of digital signals through various electromagnetic channels, telephone lines, satellites, microwaves, fiber optic cable, etc.

Data link — Any serial data communications transmission path, generally between two adjacent nodes or devices and without any intermediate switching nodes.

Data transfer rate — The average number of bits, characters, or blocks per unit of time transferred from a data source to a data sink.

DCE — Data Communications Equipment. The equipment that provides the functions required to establish, maintain and terminate a data transmission connection. In the case of an RS–232 connection, the modem is usually regarded as DCE.

Dedicated line — A dedicated circuit, a nonswitched channel, a private line.

Digital — Referring to communications techniques and equipment where information is encoded as either a binary "1" or "0".

DIP — Dual In–Line Package. An electronic component package characterized by two rows of external connecting pins.

Direct–connect modem — A modem that connects to the telephone lines using a modular plug or wired directly to the outside phone line. It thus transfers electrical signals directly to the phone network without any intermediary protective device. Direct connect modems must be certified by the FCC. Direct-connect modems are more reliable than acoustic–coupled modems.

DOS — Disk operating system.

Download — When two computers are communicating, the computer that is receiving a chunk of data or program is said to be downloading the information.

DTE — Data Terminal Equipment. The equipment acting as data source, data sink or both.

Dumb terminal — A terminal that is used to accept keyed data and transmit that data to a computer with no other processing capabilities.

EBCDIC — Extended Binary Coded Decimal Interchange Code. An 8–bit character code used primarily in IBM equipment. The code allows for 256 different bit patterns.

EIA — Electronic Industries Association. A trade organization composed of manufacturers, designers, and marketers of electronics hardware. This organization is influential in the setting of standards for electronic equipment.

External modem — A standalone modem connected externally to the computer, as opposed to an internal modem which is integrated within the computer in the form of a circuit board.

More on other side.

File server — In local networks, a station dedicated to providing file and mass data storage services to the other stations on the network.
Full duplex — In telecommunications, a mode of data communication in which both parties or devices have access to the transmission channel at the same time, thus allowing simultaneous two–way information exchange. Normal voice telephone conversations are usually full duplex. See HALF DUPLEX and ECHOPLEX.
Gateway — A node that provides a link between two or more networks. The gateway mode translates the protocols of one network into the protocols of another, so that the parties at either end can communicate with one another.
Half duplex — In telecommunications, a mode of data communication in which only one party or device has access to the transmission channel at any time. The mode of communication requires some kind of "end of transmission" signal so that the channel can then be turned over to the other party.
Handshaking — A predefined exchange of signals or control characters between two devices that establishes the conditions for the transfer of data.
Hard wired — Referring to a communications link, whether remote phone line or cable, that permanently connects two stations or devices.
ICA — International Communications Association.
Interface — A shared boundary; a physical point of demarcation between two devices, where the electrical signals, connectors, timing, and handshaking are defined. Also the procedure, codes and protocols that enable two entities to interact for the meaningful exchange of information.
Intelligent Terminal — A terminal that can be programmed.
IVDT — Integrated voice/data terminal. One of a relatively new family of devices that features a terminal keyboard/display and voice telephone instrument. Many contain varying degrees of local processing power, ranging from full personal–computer capacity to directory storage for automatic telephone dialing.
Jumper — A patch cable or wire used to establish a circuit, often temporarily, for testing or diagnostics.
K — An expression for standard quantity measurement of disk, diskette storage, semiconductor circuit capacity. A "K" of memory equals 1024 bytes (or 8–bit characters), of computer memory — slightly more than a thousand.
LED — Light–emitting diode. A device that accepts electrical signals and converts the energy to a light signal with lasers.
Local Area Network (LAN) — A network of data processing equipment residing in the same room or building or group of buildings (hence local area). Such a network is usually created using its own wiring system, although some LANs can use in–house telephone wiring or the electrical wiring of a building.
Loopback — A diagnostic procedure used for data communication devices where a test message is sent to the device being tested which is then sent back to the originator and compared with the original transmission.
Modem — Modulator–demodulator. A device that changes digital signals into a form that can be transmitted over a telecommunications channel and back again. Most modems convert digital signals to analog and vice versa.
Modem Eliminator — A device which interfaces between a local terminal that normally requires a modem and the computer near it that also normally requires a modem. It functions as an imitation modem in both directions.
Modulate — This is a key concept in all of telecommunications. Information is added to carrier signals by using one or more of three basic aspects of a carrier wave: its amplitude, its frequency, or its phase angle.
Network — A system of micros and/or micro peripherals connected by telecommunications channels.
Node — A point in a network at which a high density of information and information processing equipment is physically located. A receiving/integrating/transmitting center.
Noise — Any extraneous and unwanted signal disturbances in a communications link, usually random variations in signal voltage or current or interfering signals. Can be damaging to data.
Noise suppressor — Filtering or digital signal–processing circuitry in a receiver or transmitter that automatically eliminates or reduces noise.
Null modem cable — A specially wired cable that links two usually identical microcomputers. The cable connects the two systems so that each "believes" it is talking to a modem.
Parity bit — A basic and elementary mechanism for error checking.
Protocols — The set of conventions that defines the formatting of data. Protocols can be expressed in standards for hardware and can also be expressed in software.
RAM — Random Access Memory. Data stored is lost if power is turned off.
ROM — Read only memory. A data storage device, the contents of which cannot be altered except under certain circumstances. Permanent storage.
Receive only — Describes the operation of a device, usually a page printer which can receive transmissions but cannot transmit.
RS–232 — The designation applied to a standard designed for synchronous serial data communications between any two devices. Developed jointly by the Electronic Industries Association (EIA), the Bell System and computer and modem manufacturers. Definition includes the signal characteristics to be found on each pin, but does not specify any particular connector. The DB25 physical connector has become the conventional one used in most RS–232 cables.
Serial interface card — A printed circuit board that plugs into a microcomputer. The card changes the parallel internal communications of the micro into a one–bit–at–a–time serial transmission for sending through a modem.
Serial Transmission — A method of data transmission in which each bit of information is sent sequentially on a single data channel. Serial transmission is the normal transmission mode for data communications.
Short Haul Modem — A signal converter which conditions a signal to ensure reliable transmission over DC continuous private lines.
Synchronous transmission — Characters or bits are sent at a fixed rate with the transmitting and receiving devices synchronized. Synchronous transmission significantly increases data throughput rates.
Telex® — Teleprinter Exchange; a teleprinter dial network offered by Western Union and the International Record Carriers. Uses baudot code.
Voice digitization — The conversion of an analog voice into digital symbols for storage or transmission.
X–ON/X–OFF — Transmitter ON/transmitter OFF. Commonly used communication control characters used to instruct a terminal to suspend transmission, or to start or resume transmission, respectively.

FOR SALE

GORRILLA BANANA PRINTER
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Xtra ribbons and inkers.
$75.00
Contact:Bob Crecco
948–1414

A more thorough and detailed glossary will be in next months S.L.U.G. newsletter along with in depth details of popular interfaces such as RS–232, RS–449, GPIB, and CENTRONICS. Communication protocols and transmission methods will also be included.

The following pages contain diagrams of popular communication, printer, and system interconnectors and their respective pinout signals and/or colors.

IEEE–488 Programmable Interface

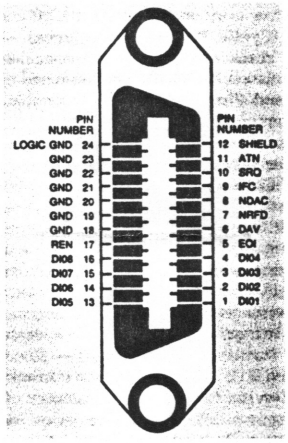
The IEEE–488 standard defines the digital interface for programmable instrumentation. The interface transmits data in a byte-serial, bit-parallel fashion among a group of instruments and system components. We have briefly described the types of devices, the bus structure, and the connector pinout of the IEEE–488 interface.

GPIB Devices

In general, there are three types of devices connected to the GPIB bus:
1 – Talkers: the talker is a device configured to allow it to place data on the bus, transmitting it to one or more devices. Normally, there is only one talker active at a time.
2 – Listeners: the listener accepts data from the bus by means of a defined handshake sequence. The bus allows for more than one listener to be active at a time.
3 – Controller: the controller of the bus is the only device that is capable of asserting the ATN line, which tells all of the devices to get ready to accept commands. There is only one controller active at a time in the system. When two or more controllers are connected to a bus, control must be passed from one device to another.

Bus Structure

The GPIB bus consists of 16 active lines. These are divided into three groups: data lines, control lines and handshake lines. The lines are held at +5 VDC for logical zero (false), and pulled to ground for a logical one (true).



Data Lines

The data bus (lines DI01 through DI08) is used to allow transfer of data, control words or device addresses. The data may be of binary or ASCII types.

Control Lines

This line is used by the controller to specify how data on the D10 lines is to be interpreted.

IFC (Interface Clear) — Used by the controller to place the interface system (including all interconnected devices) in a known quiescent state.

SRQ (Service Request) — This line is asserted by a device to indicate a need for some service sequence.

REN (Remote Enable) — When a controller asserts REN, the listening device will ignore its front panel controls.

EOI (End Or Identify) — This line has two functions: 1) It may be asserted by a talker to indicate the end of a multi-byte transfer (the END message), or 2) it is asserted by the controller in conjunction with the ATN line when executing a parallel poll.

Handshaking Lines

The handshake bus consists of three lines used to exchange data across the GPIB.

DAV (Data Valid) — This handshake line is asserted by a controller to indicate that it has placed a control byte on the data bus.

NRFD (Not Ready For Data) — This line is asserted by an active listener to stop any new data or control bytes from being placed on the bus until it is ready to accept the next byte. The controller or talker monitors this handshake line and waits until it is deasserted before sending the next byte.

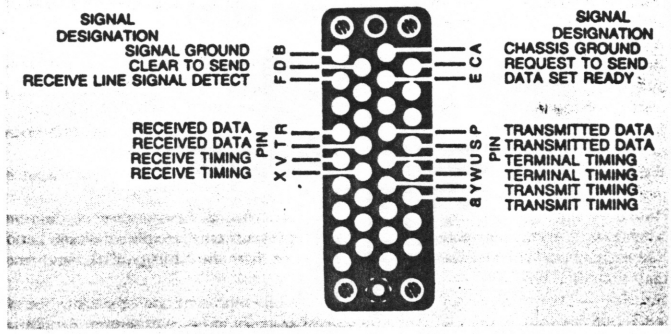
NDAC (No Data Accepted) — This handshake line is asserted by the listener to indicate that it has not yet accepted the last byte that was placed on the bus.

V.35 Data Interchange Interface

V.35 is the CCITT standard for data transmission at 48 Kbps per second using 60–108 KHz group band circuits. The interface is typically used on DTE or DCE equipment interfacing to a high-speed digital carrier such as AT&T's Dataphone® Digital Service (DDS).

We have included a physical connector diagram and a chart of the signals and signal directions for convenient reference.

V.35 Interface



PIN	NAME	To DTE	To DCE	FUNCTION
A	FG			Frame (or protective) ground
B	SG			Signal (or reference) ground
C	RTS		→	Request to send
D	CTS	←		Clear to send
E	DSR	←		Data set ready
F	RLSD	←		Received line signal
H	DTR		→	Data terminal ready
J	RI	←		Ring indicator
K	LT		→	Local test
R				Received data (Sig. A)
	RD	←		
T				Received data (Sig. B)
V				Serial Clock receive (Sig. A)
	SCR	←		
X				Serial Clock receive (Sig. B)
P				Send data (Sig. A)
	SD		→	
S				Send data (Sig. B)
U				Serial Clock Xmit Ext. (Sig. A)
	SCTE		→	
W				Serial Clock Xmit Ext. (Sig. B)
Y				Serial Clock Transmit (Sig. A)
	SCT	←		
a				Serial Clock Transmit (Sig. B)
h, i, j, k, m, n				Unused
L, M, N, Z, b, c, d, f, g				Unused

TECHNICAL INFORMATION

RS-232 Interface

SIGNAL DESIGNATION	PIN NUMBER	PIN NUMBER	SIGNAL DESIGNATION
SECONDARY TRANSMITTED DATA	14	1	PROTECTIVE GROUND
DCE TRANSMITTER SIGNAL ELEMENT TIMING	15	2	TRANSMITTED DATA
SECONDARY RECEIVED DATA	16	3	RECEIVED DATA
RECEIVER SIGNAL ELEMENT TIMING	17	4	REQUEST TO SEND
DIVIDED CLOCK RECEIVER	18	5	CLEAR TO SEND
SECONDARY REQUEST TO SEND	19	6	DATA SET READY
DATA TERMINAL READY	20	7	SIGNAL GROUND/COMMON RETURN
SIGNAL QUALITY DETECTOR	21	8	RECEIVED LINE SIGNAL DETECTOR
RING INDICATOR	22	9	POSITIVE DC TEST VOLTAGE
DATA SIGNAL RATE SELECTOR	23	10	NEGATIVE DC TEST VOLTAGE
DTE TRANSMITTER SIGNAL ELEMENT TIMING	24	11	EQUALIZER MODE
BUSY	25	12	SECONDARY DATA CARRIER DETECT
		13	SECONDARY CLEAR TO SEND

RS-449 Interface

SIGNAL DESIGNATION	PIN NUMBER	PIN NUMBER	SIGNAL DESIGNATION
		1	SHIELD
RECEIVE COMMON	20	2	SIGNALING RATE INDICATOR
	21	3	
SEND DATA	22	4	SEND DATA
SEND TIMING	23	5	SEND TIMING
RECEIVE DATA	24	6	RECEIVE DATA
REQUEST TO SEND	25	7	REQUEST TO SEND
RECEIVE TIMING	26	8	RECEIVE TIMING
CLEAR TO SEND	27	9	CLEAR TO SEND
TERMINAL IN SERVICE	28	10	LOCAL LOOPBACK
DATA MODE	29	11	DATA MODE
TERMINAL READY	30	12	TERMINAL READY
RECEIVER READY	31	13	RECEIVER READY
SELECT STANDBY	32	14	REMOTE LOOPBACK
SIGNAL QUALITY	33	15	INCOMING CALL
NEW SIGNAL	34	16	SELECT FREQUENCY
TERMINAL TIMING	35	17	TERMINAL TIMING
STANDBY INDICATOR	36	18	TEST MODE
SEND COMMON	37	19	SIGNAL GROUND

Parallel Interface (Centronics type)

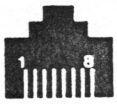
SIGNAL DESIGNATION	PIN NUMBER	PIN NUMBER	SIGNAL DESIGNATION
UNDEFIEND	36	18	+ 5V
UNDEFINED	35	17	CHASSIS GND
UNDEFINED	34	16	LOGIC GND
UNDEFINED	33	15	OSCXT
FAULT	32	14	SUPPLY GND
INPUT PRIME	31	13	SELECT
INPUT PRIME RETURN	30	12	PAPER END
BUSY RETURN	29	11	BUSY
ACKNOWLEDGE RETURN	28	10	ACKNOWLEDGE
DATA BIT 8 RETURN	27	9	DATA BIT 8
DATA BIT 7 RETURN	26	8	DATA BIT 7
DATA BIT 6 RETURN	25	7	DATA BIT 6
DATA BIT 5 RETURN	24	6	DATA BIT 5
DATA BIT 4 RETURN	23	5	DATA BIT 4
DATA BIT 3 RETURN	22	4	DATA BIT 3
DATA BIT 2 RETURN	21	3	DATA BIT 2
DATA BIT 1 RETURN	20	2	DATA BIT 1
DATA STROBE RETURN	19	1	DATA STROBE

V.35 Interface

SIGNAL DESIGNATION	PIN NUMBER	PIN NUMBER	SIGNAL DESIGNATION
		A	CHASSIS GROUND
SIGNAL GOUND	B	C	REQUEST TO SEND
CLEAR TO SEND	D	E	DATA SET READY
RECEIVE LINE SIGNAL DETECT	F		
RECEIVED DATA	R	P	TRANSMITTED DATA
RECEIVED DATA	T	S	TRANSMITTED DATA
RECEIVE TIMING	V	U	TERMINAL TIMING
RECEIVE TIMING	X	W	TERMINAL TIMING
		Y	TRANSMIT TIMING
		AA	TRANSMIT TIMING

MODULAR PLUG PIN ASSIGNMENTS

RJ-45K

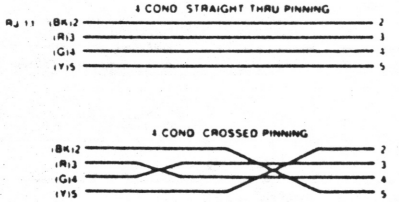


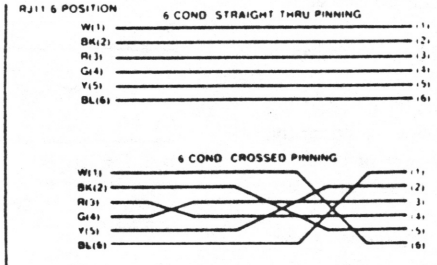
RJ-45

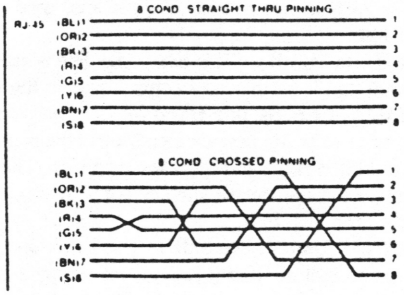
RJ11-6

RJ-11-4

MODULAR STRAIGHT AND CROSS PINNING DIAGRAMS







THE RAMTOP

APRIL 1987

PUBLISHED BY THE
GREATER CLEVELAND SINCLAIR USERS GROUP

```
1005 REM ######################
1006 REM          RLE DECODER U
SED WITH RLE COMPILED BASIC
1007 REM ######################
1008 REM FROM TIME DESIGNS 2-87
1020 CLEAR 39999: PRINT #4: LOAD
 "rle.decode"CODE 30000
1090 REM          LOAD
1100 CLS : GO SUB 8000
1110 CLS : RANDOMIZE USR 30000
1190 REM      SAVE
1200 INPUT #0;AT 0,0;"FILE NAME=
";: LINE N$: GO SUB 8500: CLS
1210 RANDOMIZE USR 31265
1220 GO TO 1200
8000 PRINT INVERSE 1;AT 4,4;"DO
YOU WANT TO:"
8005 PRINT '''TAB 4;"1. LOAD FR
OM TAPE"';TAB 4;"2. LOAD FROM D
ISK"';TAB 4;"3. CATALOG": INPUT
 G: IF G<1 OR G>3 THEN GO TO 800
0
8010 IF G=1 THEN CLS : PRINT AT
10,8;"PLAY YOUR RLE TAPE": LOAD
 ""CODE 40000: RETURN
8020 IF G=2 THEN INPUT "WHAT IS
THE FILE NAME? ";N$;'"FROM DRIVE
 #? ";D: PRINT #4; LOAD N$CODE 4
0000: PRINT D: RETURN
8025 IF G=3 THEN INPUT "WHICH DR
IVE # ?";D: PRINT #4; CAT "";: P
RINT D: PAUSE 0: CLS
8030 GO TO 8000
8500 PRINT INVERSE 1;AT 4,4;"DO
YOU WANT TO:"
8505 PRINT '''TAB 4;"1. SAVE TA
PE"';TAB 4;"2. SAVE TO DISK"';
TAB 4;"3. LOAD ANOTHER RLE FILE"
';TAB 4;"4. RETURN": INPUT G:
IF G<1 OR G>4 THEN GO TO 8500
8560 IF G=1 THEN CLS : PRINT AT
10,0;"PREPARE TO SAVE YOUR RLE F
ILE " : SAVE N$CODE 50000,6912:
RETURN
8570 IF G=2 THEN INPUT "TO WHAT
DRIVE # ?";D: PRINT #4; SAVE N$C
ODE 50000,6912: PRINT D: RETURN
8575 IF G=3 THEN GO TO 1025
8576 IF G=4 THEN RETURN
8580 GO TO 8500
9999 PRINT #4: SAVE "RLE" LINE 1
020: PRINT #4: SAVE "rle.decode
"CODE 30000,1970
```

From Tom Simon

RLE GRAPHICS

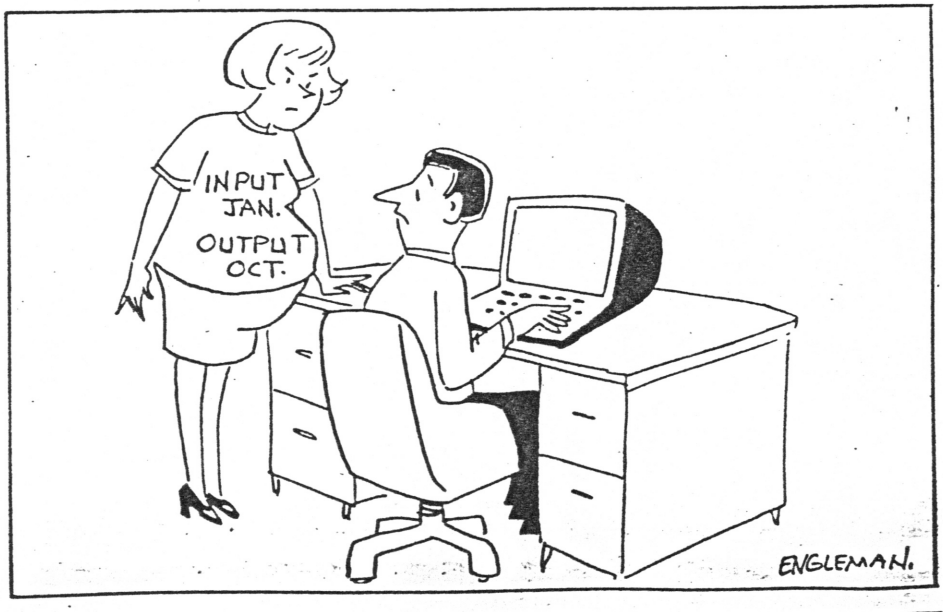
ONE OF THE MORE INTERESTING DEVELOPMENTS ON THE TIMEX SCENE HAS BEEN THE INTEREST IN DECODING OF RLE GRAPHIC FILES. RLE STAND FOR RUN LENGTH ENCODED GRAPHICS, THIS IS A SYSTEM WHICH IS USED TO PROVIDE A 256 BY 192 PIXEL DISPLAY. RLES WERE DEVELOPED ON COMPUSERVE TO PROVIDE A GRAPHICS STANDARD FOR DIFFERENT MACHINES. COMPUSERVE'S VIDTEX SOFTWARE HANDLES THESE FILES. THE SINCLAIR MACHINES DO NOT HAVE THE SOFTWARE TO VIEW THE PICTURES ON LINE. I BELIEVE THAT JOHN RYAN WROTE THE FIRST PROGRAM FOR THE 2068 TO DECODE THE RLE FILES OFF LINE. IN A RECENT ISSUE OF TIME DESIGNS STAN LEMKE OFFERED A BASIC VERSION OF JOHN RYAN'S RLE DECODER TO BE USED WITH THE TIME MACHINE BASIC COMPILER. THIS DECODES THE SCREEN IN ABOUT 15 SECONDS OR SO. BESIDES APPEARING ON COMPUSERVE SOME BBS'S (INCLUDING THE TSU) HAVE RLE FILES TO DOWNLOAD.

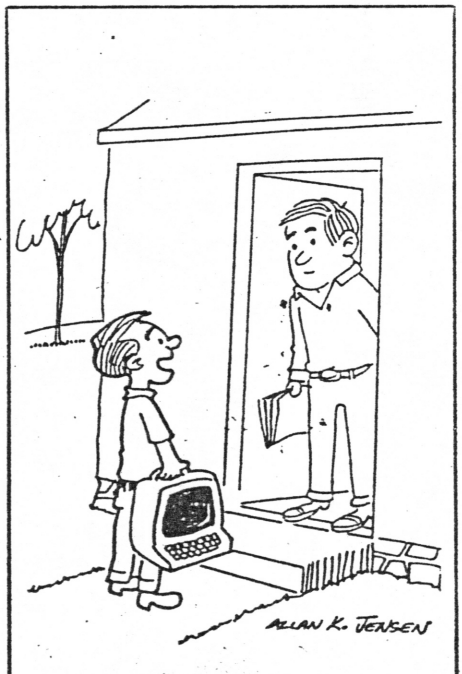
IF YOU ARE A SUBSCRIBER TO COMPUSERVE, YOU CAN FIND THESE FILES BY TYPING IN GO HHA, GO PICS,GO TEN, GO MAPS GO ARTSIG OR GO CBPIX. YOU WILL HAVE A LARGE SELECTION TO CHOOSE FROM. IF YOU WANT TO HAVE YOUR OWN PICTURES DIGITIZED, COMPUSERVE WILL DO IF FOR YOU, FOR A FEE OF COURSE.

IF YOU ARE USING A 2068, ONCE YOU HAVE DOWNLOADED YOUR RLE FILE YOU SHOULD SAVE IT TO TAPE AS BASIC SO YOU CAN TRANSFER IT TO ANOTHER BOARD OR MEDIUM. DOING SO WILL PERMIT VARS ON THE 2068 TO BE SET CORRECTLY. THE RLE FILE MUST BE SAVED AS CODE TO BE READ BY THE DECODER. HOWEVER IN THIS FORM VARS IS NOT SET CORRECTLY AND THE FILE CANNOT BE LOADED INTO THE COMPUTER AND COPIED WITHOUT SOME FANCY FOOTWORK TO RESET VARS. IT IS BEST TO MAKE A NOTE OF HOW MANY BYTES THE FILE IS BEFORE LEAVING MTERM II. ALL RLE FILES USE WHITE INK ON BLACK PAPER SO THAT TO COPY THEM TO A PRINTER THE ATRIBUTES MUST BE INVERTED. THE LEMKE PROGRAM FROM TIME DESIGNS DOES THIS BY LOOKING FOR AN INPUT OF I, INPUT C AND YOU CAN COPY THE SCREEN TO THE 2040 PRINTER. I WILL TAKE YOU TO A SAVE MENU. I HAVE MODIFIED THE MENU TO WORK WITH MY DISK DRIVE WHICH USES THE PRINT #4; COMMAND TO ACCESS IT. THE FOLLOWING LISTING IS TO REPLACE THE UNCOMPILED BASIC OF THE LEMKE PROGRAM. YOU WILL ADD THIS TO THE PART TO BE COMPILED WHICH APPEARED IN THE FEBUARY ISSUE OF TIME DESIGNS. MODIFY THIS FOR YOUR MASS STORAGE SYSTEM BY INSERTING YOUR SYSTEMS COMMANDS ON THE APPROPIATE LINES. IF YOU HAVE A QL DAVE HOSHOR HAS PROVIDED A LISTING FOR A RLE RLE DECODER TO BE USED ON THAT MACHINE.

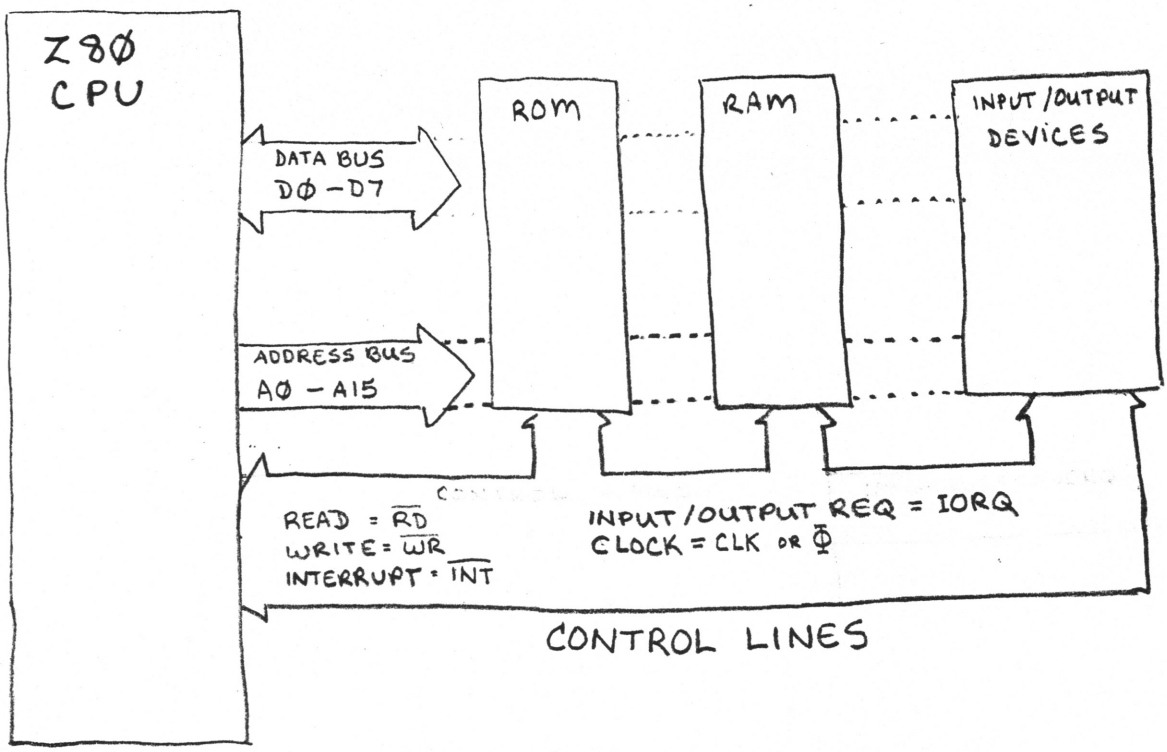
more →

```
100 REMark ********** RLE DECODER **********
110 REMark Enter picture "device_filename"
120 DEFine PROCedure picture (file$)
130  LOCal col,lin,wid
140  MODE 4:WINDOW#1,512,256,0,0:PAPER#1,7:INK#1,0:CLS#1
150  WINDOW#1,411,184,53,11:PAPER#1,0:CLS#1
160  WINDOW#1,411,194,53,12:PAPER#1,0:INK#1,7:CLS#1:SCALE#1,193,-1,-1
170  WINDOW#0,409,30,53,226:PAPER#0,7:INK#0,0:CLS#0
180  OPEN #4,file$
190  IF lookfor("G") = 0 THEN RETurn
200  IF lookfor("H") = 0 THEN RETurn
210  col = 0: lin = 192
220  REPeat get_col_wid
230   IF EOF(#4) THEN EXIT get_col_wid
240   col = col + CODE (INKEY$ (#4,500)) -32
250   IF EOF(#4) THEN EXIT get_col_wid
260   wid = CODE (INKEY$ (#4,500)) -32
270   IF col + wid < 256 AND wid > 0
280    LINE col,lin TO col + wid,lin: col = col + wid
290   ELSE IF col + wid > 255 AND col < 255
300    LINE col,lin TO 255,lin
310    lin = lin -1
320    col = (col + wid) MOD 256
330    IF col > 0 THEN LINE 0,lin TO col,lin
340   ELSE IF col + wid > 255 AND col > 254
350    lin = lin -1
360    col = (col + wid) MOD 256
370    IF col > 0 THEN LINE 0,lin TO col,lin
380   END IF : END IF : END IF
390  END REPeat get_col_wid
400  CLOSE #4
410 END DEFine picture
420 DEFine FuNction lookfor(a$)
430  REPeat loop
440   IF EOF(#4) THEN RETurn 0
450   IF INKEY$(#4,30) = a$ THEN RETurn 1
460  END REPeat loop
470 END DEFine lookfor
```





"Can Jimmy come out and compute?"



128 64 32 16 8 4 2 1 ← VALUE REPRESENTED BY A "1" FOR EACH BIT POSITION

BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0	← A BYTE OF DATA
0	0	0	0	0	0	0	0	= 0
0	0	0	0	0	0	0	1	= 1 decimal
0	0	0	0	0	1	0	1	= 1+4 = 5
0	0	1	0	1	0	1	0	= 2+8+32 = 42
1	1	1	1	1	1	1	1	= 128+64+32+16+8+4+2+1 = 255

HEX - DECIMAL - BINARY CONVERSIONS

DECIMAL	BINARY (4 BIT)	HEXIDECIMAL
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

A 8 BIT BINARY NUMBER (THAT IS, ONE BYTE) MAY BE REPRESENTED BY A DECIMAL NUMBER UP TO '255' OR IT MAY BE REPRESENTED BY TWO HEXIDECIMAL DIGITS UP TO 'FF'. YOU CAN EASILY BREAK DOWN THE BINARY BYTE INTO HEX BY FIRST CONVERTING THE FOUR RIGHTMOST BINARY BITS USING THE ABOVE TABLE, THEN CONVERTING THE FOUR LEFTMOST BITS. EXAMPLE:

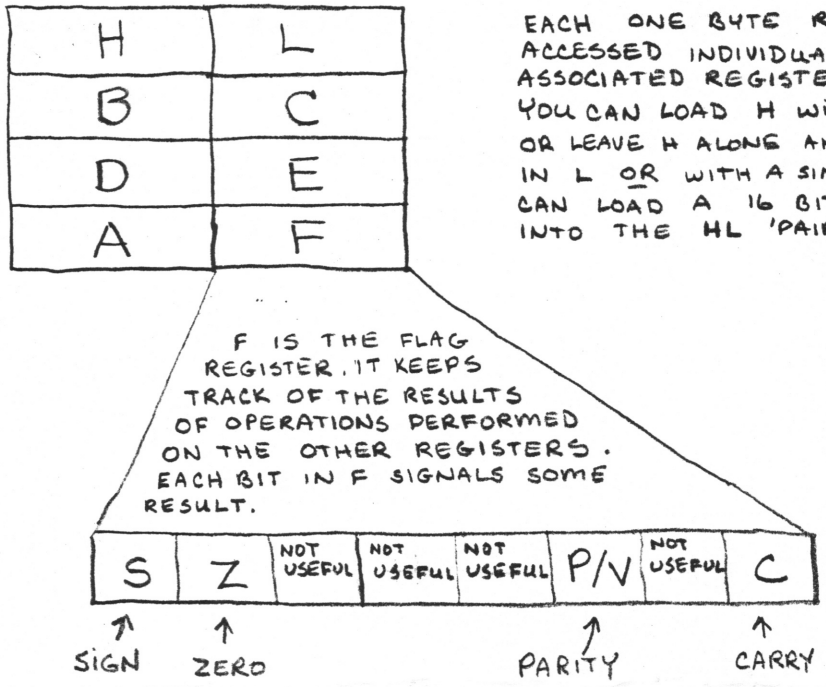
TO CONVERT 1011 0001 bin. TO HEX

LOOK THIS UP FIRST → = 1 hex

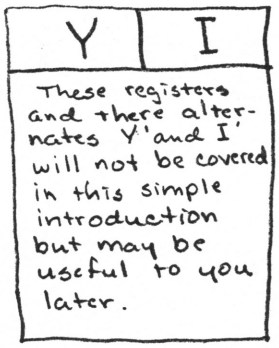
NOW THIS SIDE → = B hex

answer = 1B hex

Z80 internal registers



EACH ONE BYTE REGISTER CAN BE ACCESSED INDIVIDUALY OR WITH ITS ASSOCIATED REGISTER. FOR EXAMPLE, YOU CAN LOAD H WITH SOME NUMBER OR LEAVE H ALONE AND PUT SOME NUMBER IN L OR WITH A SINGLE INSTRUCTION YOU CAN LOAD A 16 BIT (TWO BYTE) NUMBER INTO THE HL 'PAIR'.


Y
I
These registers and there alternates Y' and I' will not be covered in this simple introduction but may be useful to you later.

TWO OTHER IMPORTANT INTERNAL REGISTERS:

SP = STACK POINTER — a two byte register which points to a place in RAM where register values may be temporarily stored.

PC = program counter - a two byte internal register which holds the address of the machine code instruction under execution

There is an alternate set of registers H'L', B'C', D'E', A'F', which can be used but is best left alone on the T/S computer

Some Simple Operations to Start You Off

LD A, 10h - In english this would read "load the A register with the value of 10 hex." In the computers memory it would be seen as two adjacent bytes. The first byte is called the operation or "op" code. It signals the Z80 what to do. In this case it is 3E hex. The second byte is the operand and it is simply the hex byte 10 (=16 decimal), but could be any one byte number.

LD A, (4082h) - means load the A register with the value of the byte at memory address 4082 hex (= 16514 decimal). (= 3A8240)

LD (4082h), A - means load the memory cell at 4082 hex with whatever value is contained in the A register. The value in the a register is unchanged (=328240)

LD B, A - Put whatever is in A into B. (=47h)

DEC A - Decrement the A register (= 3Dh)

JP Z 4088 - Test the zero flag in the F register. If it set, ie. it = 1, then jump to the instruction at memory address 4088h. (= CA8840)

WEYMIL CORP.
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PRESS RELEASE

DELTA DEVICE The Non Volatile Memory System (NVMS) TS 1000

The DELTA DEVICE is the first non-volatile memory system (NVMS) developed for the TS 1000 family of computers. It consists of a 32K non-volatile memory board and the Rigter Operating System (ROS). The product was developed by MR. WILF RIGTER and is marketed exclusively by WEYMIL CORP.

The board measures 3 1/2" by 3". It uses only two chips. It comes complet with a built-in write protect switch to prevent accidental erasure of data. The 32K is divided into four 8K blocks which can be independantly switched via DIP switch to various locations in the Sinclair memory map. The memory contents are preserved with a long-life battery. The board comes complete with a feed-throug connector. You can control the memory of either 16K or 32K rampacks. Additonal non-volatile memory devices (such as the HUNTER BOARD or DELTA DEVICES) can be added for bank switch applications. You can also connect other peripherals. The circuitry of the DELTA DEVICE greatly reduces the risk of data loss caused by removing and replacing the unit on the computer. This makes the system very transportable. The hardware itself has four times the capacity and more flexibility than other similar memory enhancement products.

The NVMS concept is completed by the RIGTER OPERATING SYSTEM (ROS). The DELTA DEVICE is the first device of its kind to incorporate a full file handlin system. ROS supports the following features. DIRECTORY lists all of the program stored in memory by name and length. You have 44 entries per directory. SAVE transfers BASIC programs, varibles, or machine code to storage. It works in conjunction with the NAME/RENAME features. LOAD transfers programs to their normal RUN areas. MERGE allows the joining of two BASIC programs or varible files. EXIT allows you to quit ROS to an auto-run program or the command line. ERASE deletes programs from system memory and moves other programs to fill the space left behind. This eliminates blank areas of memory between files. The cursor is used to select files.

One of the unique features of ROS is that it is called up via "hot key". ROS follows terminate-and-stay-resident (TSR) protocols until the REM key is pressed followed by ENTER from the command line. When triggered, ROS is immediately available.

The DELTA DEVICE comes with ROS enhancements for more flexibility. CLEAR DIRECTORY allows initialization of selected sections of system memory while leaving others intact. RENUMBER is a natural companion to the MERGE command. UNMERGE deletes blocks of BASIC programs. ROS uses less than 600 bytes.

The extremely efficent use of code is the trademark of WILF RIGTER who ha developed the RIGTER SOFTWARE PROGRAMMABLE JOYSTICK INTERFACE, the WRX-16 Hi-Re Core which has created the new standard for TS 1000 hi-res software such as THRUST, and NOVA the 512 byte utility which delivers true multi-tasking to the TS 1000.

The applications of the DELTA DEVICE are broad. A user can now have programs such as THRUST, NOVA, MINI-XMOD, KRUNCHER, and a word processor instantly available with plenty of room left over. No standard NVM can equal that feat. By mapping a section of the NVMS into the ROM area, a user can eas enhance the operating system. For example, one can design a customized prompt hi-res graphics, or a high-speed tape loader all accessible from the standard Sinclair command keys. The DELTA DEVICE will allow the user to have more than one operating system available on the same machine. The user can now install FORTH and PASCAL along with the standard system. The DELTA DEVICE is totally compatible with THRUST and other hi-res programs.

Available for $75.00 plus $5.00 shipping and handling
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